Addendum to the Environmental Assessment of Multiklient Invest Newfoundland Offshore Seismic Program, 2018–2023

Prepared by

LGL LIMITED
environmental research associates

Prepared for

Multiklient Invest AS

&

TGS-NOPEC Geophysical Company ASA

April 2018
LGL Project No. FA0106A-1

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INTRODUCTION

This document is an Addendum to the Environmental Assessment of Multiklient Invest AS Newfoundland Offshore Seismic Program, 2018–2023. It addresses comments on the Environmental Assessment (EA) as submitted by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) to MKI on 6 April 2018. Comments were received from the Department of National Defence (DND), Groundfish Enterprise Allocation Council (GEAC)-Canadian Association of Prawn Producers (CAPP), Fish, Food and Allied Workers (FFAW), C-NLOPB, and Fisheries and Oceans Canada (DFO).

GENERAL COMMENTS

Department of National Defence (DND)

General Comment #1: Department of National Defence (DND) MARLANT Safety and Environment (MARL SE) has the following comments:

- Please identify a specific individual or office to serve as a Point Of Contact (POC) for MARLANT queries and concerns;
- Please ensure the appropriate Notice to Mariners will be issued for all underwater activities and any significant surface ventures, such as use of flares, buoys, and unconventional night lighting;
- Please ensure the appropriate Notice to Airmen will be issued for all activities that could affect air safety, such as use of balloons, Unmanned Aerial Vehicles (UAVs) or tethered airborne devices; and
- Please ensure engagement of CTF 84, through Director General Naval Strategic Readiness (DGNSR), to ensure de-confliction with possible Allied submarine activities.

The UXO Program has conducted a search of our database and there are two identified UXO sites of concern in that area (see attached) and numerous shipwrecks. Due to the fact that there may be uncharted shipwrecks or other UXO sites or munition dumps, and in the event activities are conducted that have contact with the seabed (such as drilling or mooring), it is strongly advised that operational aids, such as remotely operated vehicles, be used to conduct seabed survey to prevent unintentional contact with harmful UXO items, shipwrecks, or dumpsites that are not noted on the maps. Should any suspected UXO be encountered during the course of the operations, do not disturb/manipulate it. Please mark the location and immediately inform the Coast Guard. Additional information is available in the 2010 Annual Edition - Notices to Mariners, Section 37. Further UXO general information is available at our website at www.uxocanada.forces.gc.ca.

Response: The contact information for Mr. Jason Norman, the POC for MARLANT, was provided in subsection 1.4.1 of the EA. MKI will ensure appropriate Notices and engagement occurs, as per the bulleted list in subsection 5.7.2 of the EA. The remainder of the above comment was addressed in the second-last paragraph of subsection 5.6 of the EA, on page 156.

Fish, Food and Allied Workers (FFAW)

General Comment #1: When working in the Newfoundland and Labrador jurisdiction it is important that seismic operators have a general understanding of the spatial and temporal nature of the local fishing industry. The commentary in the revised EA Report uses 2014 and 2015 fishing data and discusses catch weights, gear type (and sometimes value) but doesn't factor in the sizes and numbers of fishing vessels that prosecute the local inshore and offshore fisheries. Using terms such as "…the most important commercial species…" is misleading. The most important commercial species for any fishing vessel is highly dependent on the individual fishing enterprise. As well, the gear type used is often also dependent on the individual enterprise. Things can change very quickly in the fishing industry, including the DFO-industry post-season crab survey. Therefore, it is in the seismic operator's best interest to maintain effective and regular communication with the fishing industry throughout the EA lifespan to keep apprised of ongoing developments within our dynamic fishing industry.

As an additional mitigation measure it is recommended that the proponent overlay the most recent fisheries catch data over the specific areas of interest for seismic exploration each year. While fisheries can vary from year to year some knowledge of expected fishing activity would help the proponent with operational planning prior to starting work for the season. Understandably this information would not be provided in an EA that is publically available. However it would be a great tool for individual operators to use in discussions with the fishing industry from year to year. Furthermore, consultation of this operational plan prior to the start of the season would allow time for changes/modifications, if necessary.

Response: The commercial fisheries summary in the EA is intended to provide a general summary of the fisheries within the Study Area. The Proponent acknowledges that fishing vessel size and number were not included in the summary of commercial fishing activity within the Study Area, and may incorporate this methodology in future analyses in order to better represent the most important commercial species and/or gear types for a given vessel length class. MKI commits to maintaining effective and regular communication with the fishing industry throughout the Project's lifespan.

The most recent commercial fisheries data available from DFO is for 2015, as presented in the EA. The Proponent has been requesting data for 2016 from DFO since September 2017. DFO has informed the Proponent that they are

experiencing a backlog in fulfilling data requests, and the Proponent has yet to receive updated data. Once these data becomes available the Proponent will incorporate this information into planning presentations for discussion.

Groundfish Enterprise Allocation Council (GEAC)-Canadian Association of Prawn Producers (CAPP)

General Comment #1:

Original Comment: We appreciate the improved planning and activity reports that are described by the Addendum, but our concerns continue to exist, and some word-smithing of the report are not sufficient to address our concerns on the relationship between seismic exploration activity and catch rates experienced by our harvesters. MKI Reply: We acknowledge the existing data gap on the effects of seismic surveying on the catchability of commercial fish/invertebrate species. We understand that research funding bodies (ESRF and Petroleum Research Newfoundland and Labrador [PRNL]) have and will fund studies to address this data gap. As noted above, MKI will continue to support this important research.

MKI Reply to Original Comment: We acknowledge the existing data gap on the effects of seismic surveying on the catchability of commercial fish/invertebrate species. We understand that research funding bodies (ESRF and Petroleum Research Newfoundland and Labrador [PRNL]) have and will fund studies to address this data gap. As noted above, MKI will continue to support this important research.

Current Comment: We appreciate that MKI has undertaken to resolve our concerns but we must highlight that no new evidence has been provided. Although we appreciate that MKI both acknowledges the data gap on impacts of seismic exploration on fish and invertebrate species and expresses their support in the studies being undertaken by the ESRF and PRNL on the matter, such acknowledgement does not address our concerns at hand. MKI is the proponent and should be willing to work on this understanding directly as opposed to shifting its responsibility to other organizations. We encourage MKI to work with us and our members to generate an avoidance protocol that will create a level of comfort that any proposed work will not impact our operations. We ask that this protocol be ratified prior to this project proceeding. We also note that the purpose of an EA is to assess impacts and provide mitigation. Where effects cannot be determined, a precautionary approach is an appropriate path to take. In this case, the gap has been highlighted, but no approach to directly mitigate this has been proposed, and we find this most troubling.

Response: MKI is committed to continue working with fisheries stakeholders to mitigate potential effects of its proposed seismic survey(s) on groundfish and shrimp resources. MKI continues to work with all fisheries groups to avoid key active fishing areas to the extent possible. To reiterate, over the last three years

MKI has participated in and where feasible will continue to support seismic studies undertaken by DFO, ESRF and PRNL. It is MKI's position that providing support to such comprehensive and independent scientific studies provides more value than MKI attempting to undertake a smaller, less robust study on its own.

SPECIFIC COMMENTS

Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB)

Specific Comment #1: § 2.5 Consultations – please provide an update on consultations.

Response: Recent consultation meetings have focused on fishing with FFAW and DFO. Following on from these, MKI attended a meeting with the crab fleet representatives discussing and answering questions about the forthcoming season. Further imminent meetings are planned with FFAW, Ocean Choice and DFO to review the more detailed plans for the 2018 season. In addition, MKI has distributed the newsletter that it sends out to an established list of stakeholders on an annual basis (see Appendix A).

Specific Comment #2: § 5.7.2 Generic Activities – Marine Use, page 157 – as per Section 2.2 Project Overview, page 7, "It is anticipated that the PGS vessels Ramform Tethys, Ramform Titan and/or Ramform Sterling will be used in 2018 to acquire 3D data. In 2018, the proposed 2D seismic survey will be acquired by the PGS vessel Sanco Atlantic (formerly the Atlantic Explorer)." This section, and any other places in the EA Report, should be changed to reflect the possibility of multiple (up to four) seismic vessels.

Response: So noted. Edit the first sentence of Subsection 5.7.2 Generic Activities – Marine Use, as follows:

> From "Project-related traffic will include one seismic survey vessel and one escort vessel." to "Project-related traffic will include one seismic survey vessel and one escort vessel per survey, up to a maximum of four concurrent seismic vessels during a survey year."

The residual effects of up to three concurrent 3D surveys and one 2D survey were considered within subsection 5.8 Cumulative Effects. Multiple concurrent seismic surveys were also considered in subsection 5.8.3 Other Oil and Gas Activities. All other instances of information relating to vessels are independent of the number of seismic vessels at a given time.

Specific Comment #3: § 5.8.3 Other Oil and Gas Activities –This section should be updated accordingly.

> ***Response***: Change text on page 24 from "Statoil are currently in the process of proposing a three-year extension to its EA of exploration and appraisal/delineation drilling program for offshore Newfoundland, 2008–2016. If the EA Amendment receives a positive determination from the C-NLOPB, the temporal scope will be extended to 2019." to "Statoil recently received a positive determination from the C-NLOPB to expand the temporal scope of its EA of exploration and appraisal/delineation drilling program for offshore Newfoundland from 2008–2016 to 2008–2019."
>
> Additionally, change the last bullet point on page 24: "Husky Energy Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008–2017" to "Husky Energy Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008–2020."

Fisheries and Oceans Canada (DFO)

Specific Comment #1: § 4.2.1.1 Plankton, paragraph 1, last sentence, page 42 – Recommend removing reference to offshore Labrador when providing baseline information on the Study Area, as it causes some confusion. This comment applies to various portions of Section 4.0.

> ***Response:*** So noted. Edit Section 4.0 as follows:
>
> Subsection 4.2.1.1, paragraph 1, last sentence, page 42:
>
> > From "Some of the key points concerning the various components of planktonic communities for the eastern and southern Grand Banks as well as the Labrador Shelf areas are highlighted below." to "Some of the key points concerning the various components of planktonic communities for the eastern and southern Grand Banks are highlighted below."
>
> Subsection 4.2.1.1, first bullet below first paragraph, second sentence, page 43:
>
> > From "The sea-surface temperatures for Labrador and the Newfoundland shelf were below normal to normal, and normal to above normal everywhere else in the zone for the remainder of the year." to "The sea-surface temperatures for the Newfoundland shelf were below normal to normal, and normal to above normal everywhere else in the zone for the remainder of the year."

Subsection 4.2.1.1, fifth bullet, page 43:

> From "Timing indices of the spring bloom was substantially delayed on the northern Labrador and northeast Shelf compared to those in the Flemish Pass and Flemish Cap area" to "Timing indices of the spring bloom was substantially delayed on the northeast Shelf compared to those in the Flemish Pass and Flemish Cap area".

Subsection 4.2.1.2, Deep-water Corals and Sponges, first paragraph, first sentence, page 47:

> From "A variety of coral groups occur in Newfoundland and Labrador waters." to "A variety of coral groups occur in Newfoundland waters."

Subsection 4.2.1.2, Deep-water Corals and Sponges, first paragraph, third sentence, page 47:

> From "Corals are largely distributed along the edge of the continental shelf and slope off Newfoundland and Labrador" to "Corals are largely distributed along the edge of the continental shelf and slope off Newfoundland".

Subsection 4.2.1.2, Deep-water Corals and Sponges, first paragraph, middle, page 47:

> Delete "Dense congregations of coral off Labrador are referred to as coral "forests" or "fields". Most grow on hard substrate (Gass 2003), including the large gorgonian corals (Breeze et al. 1997). Others, such as small gorgonians, cup corals and sea pens, prefer sand or mud substrate (Edinger et al. 2007)."

Subsection 4.2.1.2, Deep-water Corals and Sponges, second paragraph, first sentence, page 47:

> From "Several studies present information on the ecology of deep cold-water corals of Newfoundland and Labrador waters" to "Several studies present information on the ecology of deep cold-water corals of Newfoundland waters".

Subsection 4.2.1.2, Deep-water Corals and Sponges, last paragraph, page 50:

> From "…immediately east of the Avalon Peninsula, and the area off northeastern Newfoundland and southeastern Labrador" to "…immediately east of the Avalon Peninsula, and the area off northeastern Newfoundland".

Subsection 4.2.2.1, Snow Crab, last paragraph, last sentence, page 51:

> From "…immediately east of the Avalon Peninsula, and the area off northeastern Newfoundland and southeastern Labrador" to "…immediately east of the Avalon Peninsula, and the area off northeastern Newfoundland".

Subsection 4.2.2.1, Northern Shrimp, second-last paragraph, first sentence, page 52:

> From "…primarily in the area off northeastern Newfoundland and southeastern Labrador" to "primarily in the area off northeastern Newfoundland".

Subsection 4.2.2.1, Greenland Halibut (Turbot), second paragraph, first sentence, page 53:

> From "…Grand Banks, the slope region off southern Labrador and secondarily along the slope region of the Southern Grand Banks" to "Grand Banks, and along the slope region of the Southern Grand Banks".

Subsection 4.2.2.1, Greenland Halibut (Turbot), second paragraph, last sentence, page 53:

> From "…slope areas off northeastern Newfoundland, and the shelf and slope area off Labrador" to "…slope areas off northeastern Newfoundland".

Subsection 4.2.2.1, Redfishes, second paragraph, last sentence, page 55:

> From "…upper slope off northeastern Newfoundland and southern Labrador" to "…upper slope off northeastern Newfoundland".

Subsection 4.2.2.2, Atlantic Wolffish, second paragraph, last sentence, page 56:

Delete ", as well as on the shelf area off southern Labrador".

Specific Comment #2: § 4.2.2.1 Principal Macro-invertebrates and Fishes Commercially Harvested, Northern Shrimp, paragraph 3, page 52 – If possible, provide the status of commercial shrimp fishery closure in 2018.

Response: Edit the last sentence in the aforementioned Northern Shrimp subsection from "Note that a portion of NAFO Div. 3L where water depth <200 m is closed to commercial shrimp fishing during 2017 due to the decline of the stock (NAFO 2017a)." to "Note that a portion of NAFO Div. 3L where water depth <200 m is closed to commercial shrimp fishing during 2018 due to the decline of the stock (NAFO 2018)."

Specific Comment #3: § 4.2.2.1 Principal Macro-invertebrates and Fishes Commercially Harvested, Cockles, paragraph 2, page 52 – Data is somewhat outdated. Recommend plotting Cockle harvesting locations with more recent data.

Response: As shown in Tables 4.3–4.7 of the EA, cockles diminished considerably in relative importance in terms of catch weight and/or value during 2010–2014, and was not harvested during May–November 2012 or 2015 (Table 4.8 of the EA). Given the relatively few catch locations during 2013 or 2014 (i.e., in the years with cockle catch data since LGL [2015b] was produced), there would be little gain in plotting cockle harvesting locations. Commercial fisheries data from the DFO database for 2016 or later are not yet available. Updated fisheries data will be provided in future EA Updates as the data is made available by DFO.

Specific Comment #4: § 4.2.2.1 Principal Macro-invertebrates and Fishes Commercially Harvested, Stimpson's Surf Clam, paragraph 2, page 52 – References should be provided for current fishing patterns and stock status.

Response: Edit the third sentence in the second paragraph in the Stimpson's Surf Clam Subsection on page 52 from "Although there are four licences for offshore vessels in this fishery, only two vessels are currently active." to "There are currently three licences for four offshore clam vessels in this fishery, with two vessels actively fishing on Banquereau, NS, and one vessel fishing on Grand Bank, NL (DFO 2017a)."

Add the following at the end of the second paragraph in the aforementioned Stimpson's Surf Clam Subsection:

"The TAC for Stimpson's (Arctic) surf clam in the Atlantic and Arctic regions was 38,756 mt in 2017 (DFO 2016). Access to the Stimpson's surf clam fishery will be enhanced in 2018 by the introduction of a fourth licence representing 25% of the existing TAC (DFO 2017b)."

Otherwise, the Stimpson's surf clam portion of Subsection 4.2.2.1 of the EA referenced Subsection 4.2.2.1 of LGL (2015b) for distribution and life history information, with additional life history information referenced in Subsection 3.1.4.1 of the Southern Newfoundland SEA (C-NLOPB 2010). Fishing locations and typical fishing depths were provided in the second paragraph of Subsection 4.2.2.1 of the EA.

Specific Comment #5: § 4.2.2.2 Other Fishes of Note, Swordfish, page 56 – Some fishery statistics on Swordfish should be provided.

Response: It was noted that swordfish and great blue shark were the predominant catch species in NAFO Division (Div.) 6H in Subsection 4.3.2 Regional NAFO Fisheries (middle of second paragraph). NAFO data is currently limited to the Div. level only, preventing further refinement of fishery statistics for swordfish. Swordfish catch data during May–November 2010 were provided in Table 4.3 of the EA, representing <0.1% of the total catch weight and 0.1% of the total catch value during that period. Swordfish catch weight and value data during May–November 2011–2015 were presented in Tables 4.4–4.8 of the EA, respectively, by gear type during May–November 2010 in Table 4.9 of the EA, and by gear type and months caught during May–November 2010–2015 in Table 4.10 of the EA. As swordfish harvests consist of a relatively small portion of the Study Area catch, the EA would not benefit from the inclusion of further information beyond that in the aforementioned subsection and tables, and in the EA and SEA subsections indicated in Subsection 4.2.2.2 Other Fishes of Note, on page 56 of the EA.

Specific Comment #6: § 4.2.2.2 Other Fishes of Note, Anadromous Fishes, page 56 – Recommend providing list of Atlantic Salmon populations that may utilize the Study Area, as well as information on their distribution.

Response: As per Subsection 3.2.2.8 Atlantic Salmon *in* the Southern Newfoundland Strategic Environmental Assessment (SEA) (C-NLOPB 2010 *in* the EA), referenced in Subsection 4.2.2.2 Anadromous Fishes of the EA, "The two Atlantic salmon management areas (salmon fishing areas or SFAs) in the SEA Area are SFA 11 and SFA 12. Twenty-seven scheduled salmon rivers and 82 salmon populations occur in these two SFAs with fourteen scheduled rivers occurring within the SFA Area". The South Newfoundland and Inner Bay of Fundy populations of Atlantic salmon are further considered in the EA in

Subsection 4.6.1 Species at Risk within the Study Area, as they are under consideration by COSEWIC. As salmon were not reported in commercial fisheries within the Study Area during May–November, 2010–2015, a reflection of the 1992 moratorium, there is little reason to specifically identify the remaining 80 salmon populations that may occur there. Information relating to salmon distribution is provided in the aforementioned Subsection 3.2.2.8 of the Southern Newfoundland SEA.

Specific Comment #7: § 4.3.3.1 Historical Fisheries, paragraph 2, sentence 3, page 61 – It is unclear whether this sentence is describing Northern Shrimp or Snow Crab, as the reference is for shrimp, but crab is described. Please revise and include appropriate updated reference.

Response: Replace the "DFO 2016c" citation in the third sentence of the aforementioned paragraph with "DFO 2016b".

Specific Comment #8: § 4.3.3.1 Historical Fisheries, paragraph 1, last sentence, page 62 – If possible, provide the status of fishing moratoria in 2018.

Response: Edit the last sentence in the aforementioned paragraph from "In a continued effort to improve stocks, fishing moratoria remain in place for 2017 for several fish species, including Atlantic cod in 3LNO, American plaice in 3LMNO, witch flounder in 3L, and capelin in 3NO (NAFO 2017b,c)." to "In a continued effort to improve stocks, fishing moratoria remain in place for 2018 for several fish species, including Atlantic cod in 3LNO, American plaice in 3LMNO, witch flounder in 3L, and capelin in 3NO (NAFO 2018)."

Specific Comment #9: § 4.3.3.2 Study Area Catch Analysis, 2010–2015, paragraph 1, sentences 2–3, page 63 – Based on Table 4.3, Yellowtail Flounder has the third highest catch weight in the Study Area. Revise this text accordingly.

Response: Edit the third sentence in paragraph 1 of Subsection 4.3.3.2 from "The principal fisheries in 2010, in descending order of catch weight magnitude, targeted northern shrimp, snow crab and Greenland halibut, accounting for ~83% of the total annual catch weight (95,865 mt; see Figure 4.4)." to "Overall, the principal fisheries, in descending order of catch weight magnitude, targeted northern shrimp, snow crab and Greenland Halibut, combined accounting for ~83% of the total annual catch weight during May–November 2010 (79,894 mt of 95,865 mt; see Figure 4.4)."

Add the following after the fourth sentence in this paragraph, referring to other notable species: "Yellowtail flounder consisted of the third highest catch weight and the highest finfish catch weight in the Study Area during 2010, and Atlantic

halibut began to surpass Greenland halibut in terms of total catch weight/catch value quartile counts as of 2013."

Specific Comment #10: § 4.3.3.2 Study Area Catch Analysis, 2010–2015, Tables 4.4–4.8, Figure 4.4, pages 65–70 – Additional description on quartiles used in these Tables and Figure should be provided. For example, it is not clear why the sum of quartiles can be used as a proxy for catch in Figure 4.4, as few counts in a larger quartile could represent greater catch weight than more counts in the lower quartile. Additionally, the quartile ranges are not consistent between years, which further complicate the evaluation of inter-annual trends. Please justify the use of these data and provide explanation as to how they can be interpreted for the above noted Tables and Figure and other related Figures in Section 4.0.

Response: The Proponent agrees that the current format of commercial fisheries data provided by DFO as of 2011 is limited in usefulness and difficult to use to demonstrate annual or inter-annual trends. In its current format, the data cannot be used to demonstrate areas with more frequent/concentrated fishing activity, which would be more relevant with respect to seismic activity evaluation for an EA. Instead, spatial interpretation is limited to 6'x6' (latitude x longitude) cells where all that can be shown in a map figure is that an unknown number of catch records (minimum of one) exist within a 6'x6' cell for a particular species. The broad, quartile-based nature of the current data format prevents straightforward interpretation of the data, which can only be improved by DFO altering the data format to more closely resemble that of 2010 and earlier.

Quartile counts are used to present data summaries in tabular format (such as Tables 4.4–4.8), in order to provide a method by which the individual codes of 1–4 may be directly related to the quartile catch (kg) or value ($CAD) ranges for a given year. The total number of quartile counts is the same for either catch weight or catch value, as it is the total number of records for a given species, whereby each record contains one catch weight code and one catch value code.

As indicated in the above comment, quartile catch/value ranges are not consistent between years; therefore quartile counts cannot be used to evaluate inter-annual trends. Instead, the sum of quartile codes (range of 1–4) for catch weight for all species combined are used in graphical format, such as Figure 4.4. Using this methodology, the issue of inter-annual quartile range differences is bypassed, and the figure is constructed purely on mathematical concepts (e.g., five instances of Code 1 [i.e., 5x1] equals a sum of quartile codes of 5, and four instances of Code 4 [i.e., 4x4] equals a sum of quartile codes of 16). The more instances of quartile catch weight codes, the greater the overall catch weight. For example, during May–November 2011, all species combined had the following sum of quartile codes for catch weight: Code 1 (1,989), Code 2 (6,268), Code 3 (10,986)

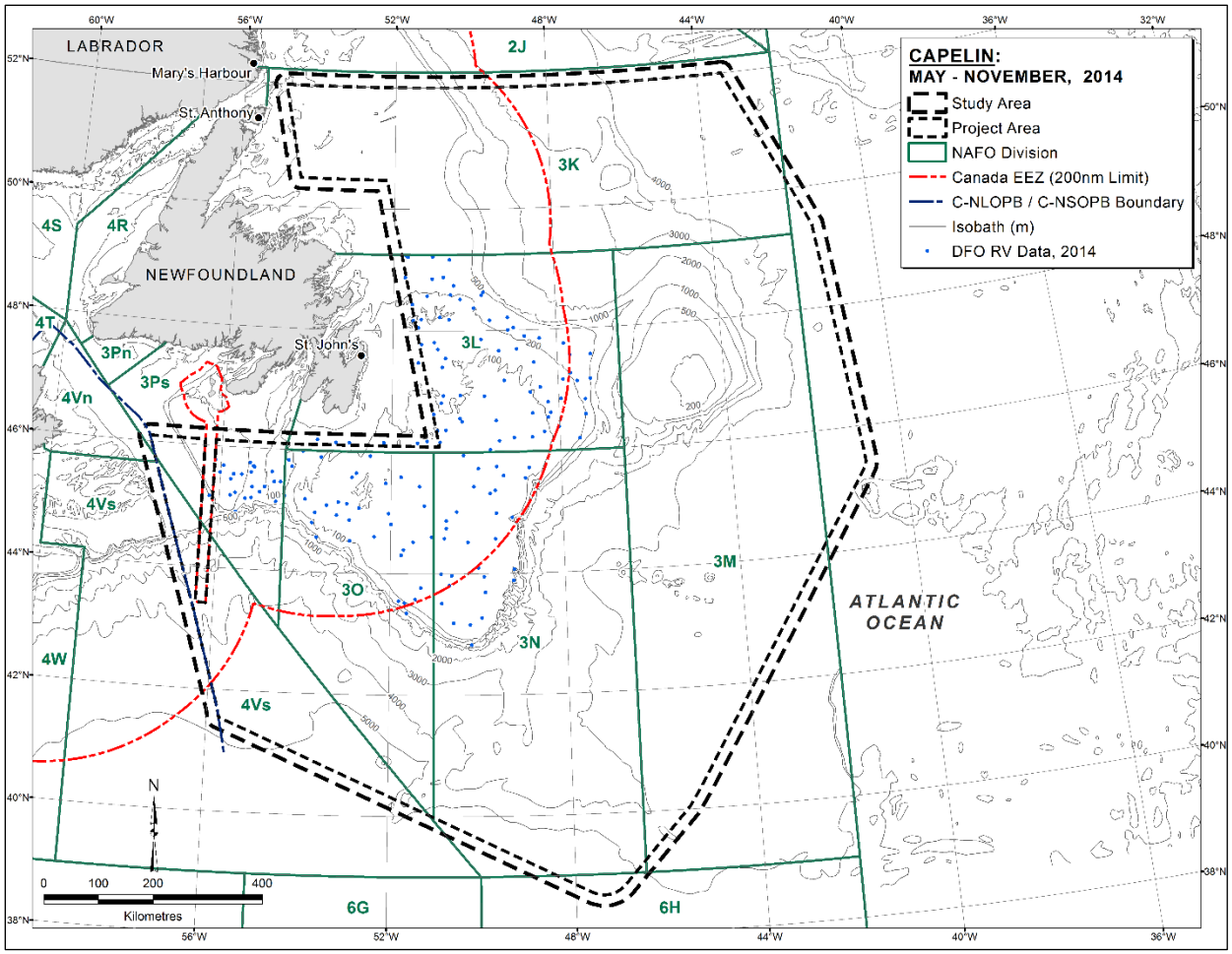
and Code 4 (7,400), for a total sum of quartile catch weight codes of 26,643. During the same period in 2015, all species combined had the following sum of quartile codes: Code 1 (1,470), Code 2 (4,134), Code 3 (5,913) and Code 4 (3,940), for a total sum of quartile catch weight codes of 15,457. Using this methodology, it can be demonstrated that the overall commercial fisheries catch weight in the Study Area decreased from 2011–2015, as shown in Figure 4.4.

Specific Comment #11: § 4.3.3.2 Study Area Catch Analysis, 2010–2015, Other Notable Species: Yellowtail Flounder, Atlantic Cod, Redfish, Atlantic Halibut and American Plaice, pages 82–90 – Based on Table 4.3, Whelk is an important commercial species, and consequently, should be discussed in the above noted section.

Response: Whelk represented 4% and 2% of the total catch weight and value, respectively, in the Study Area during May–November 2010 (Table 4.3), and 2% of the total quartile counts during May–November 2011–2015 (Tables 4.4–4.8). Its relative importance was surpassed by the species included in Subsection 4.3.3.2 during all years since 2010 (with the exception of yellowtail flounder during 2011, 2012), and by white hake and witch flounder during 2014/2015 and 2015, respectively. Whelk was indicated as one of the principal species in St. Pierre et Miquelon waters during May–November 2010 in Subsection 4.3.3.2, on page 70 in the EA. It was also summarized by catch weight and gear type during May–November 2010 in Table 4.9, and by gear type and months caught during May–November 2010–2015 in Table 4.10. It was also presented in the first bullet point of a summary of the benthic invertebrate communities within the Study Area in Subsection 4.2.1.2 of the EA, with further references provided for Subsection 4.2.1.5 of the Eastern Newfoundland SEA (C-NLOPB 2014 *in* the EA), 3.1.4 of the Southern Newfoundland SEA (C-NLOPB 2010 *in* the EA), and 4.2 of three project-specific EAs (LGL 2015a,b, 2016 *in* the EA). For the abovementioned reasons, further description of whelks in Subsection 4.3.3.2 in addition to the aforementioned Subsections and tables would not enhance the EA.

Specific Comment #12: § 4.3.7 Macroinvertebrates and Fishes Collected during DFO Research Vessel (RV) Surveys, final sentence, page 94 – Based on Table 4.11, it would also be valuable to include a figure for catch locations of Capelin.

Response: So noted. In addition to the DFO RV capelin catch locations during 2005–2009 in the Eastern Newfoundland SEA, as referenced in Subsection 4.3.7 (first sentence, second paragraph on page 91); see below for catch locations of capelin within the Study Area during May–November 2014 (Figure 1).

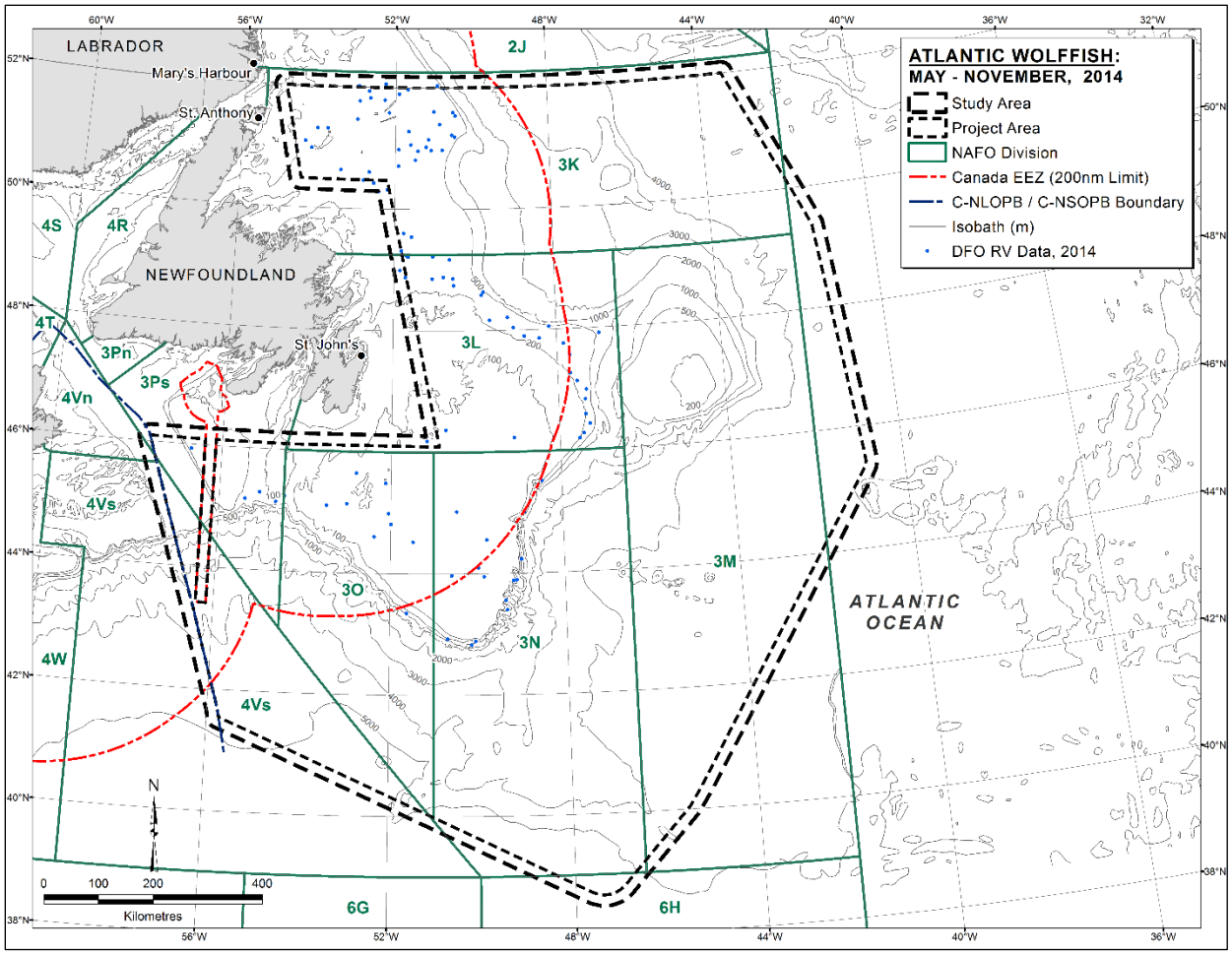


Source: DFO RV Survey database, 2014.

Figure 1. Distribution of DFO RV Survey catch locations of capelin in the Study Area, May–November 2014.

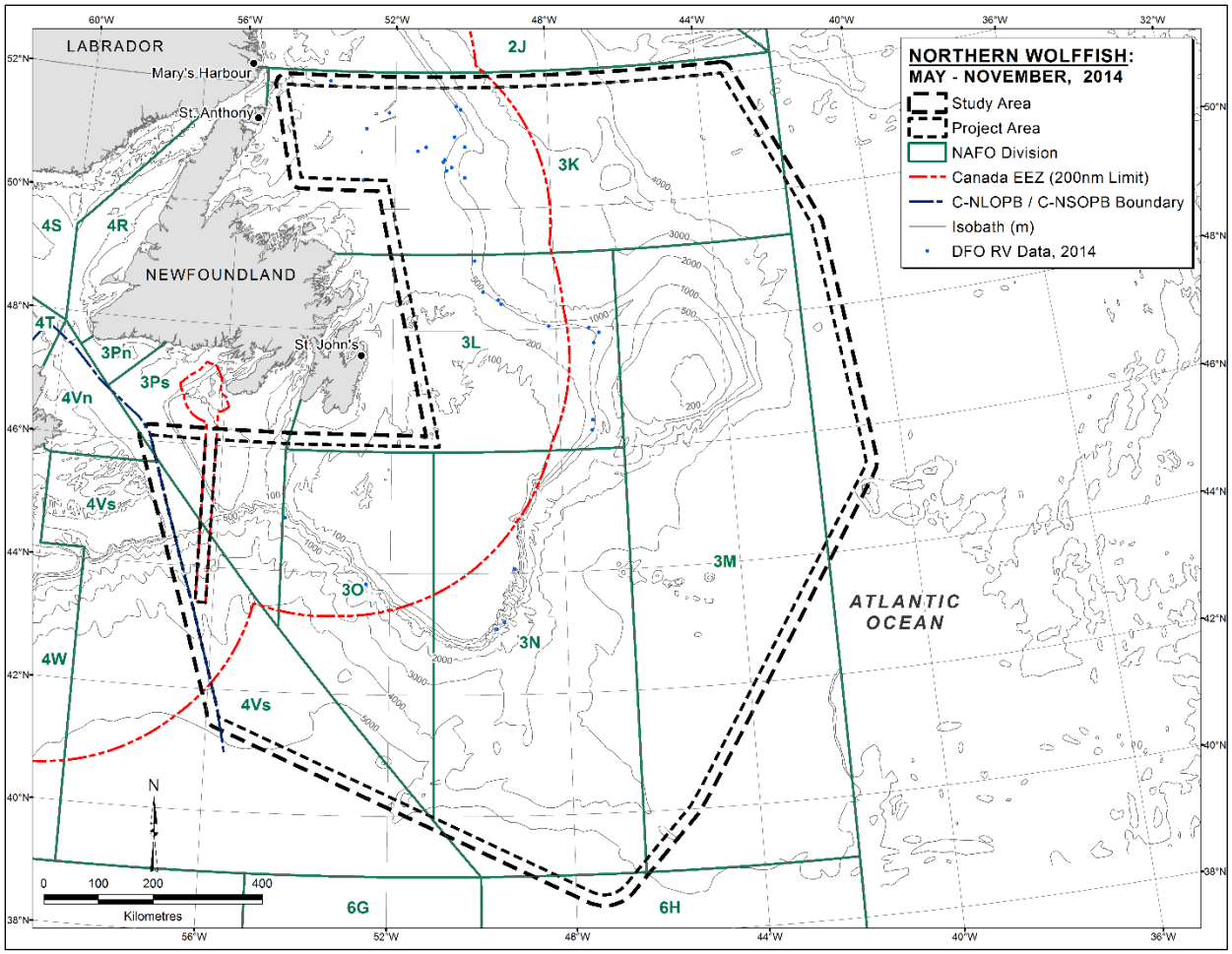
Specific Comment #13: Figure 4.33, page 104 – Catch locations cannot be easily seen. Please revise to improve figure quality.

> ***Response:*** So noted. See below for the three panels for wolffishes within the Study Area during May–November 2014.



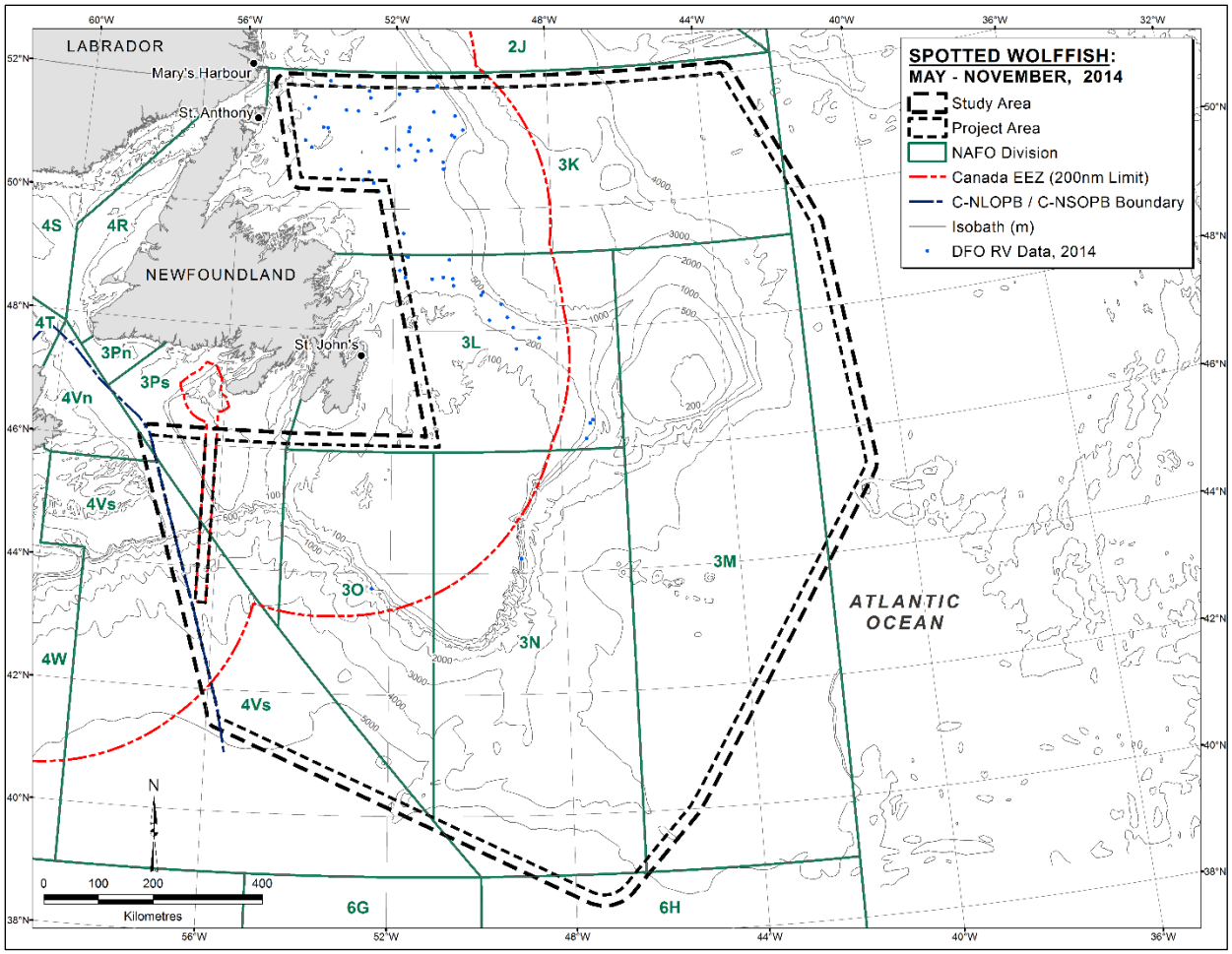
Source: DFO RV Survey database, 2014.

Figure 4.33. Distribution of DFO RV Survey catch locations of Atlantic (striped) (top), northern (middle) and spotted (bottom) wolffish in the Study Area, May–November 2014.



Source: DFO RV Survey database, 2014.

Figure 4.33. Distribution of DFO RV Survey catch locations of Atlantic (striped) (top), northern (middle) and spotted (bottom) wolffish in the Study Area, May–November 2014 (cont'd).



Source: DFO RV Survey database, 2014.

Figure 4.33. Distribution of DFO RV Survey catch locations of Atlantic (striped) (top), northern (middle) and spotted (bottom) wolffish in the Study Area, May–November 2014 (cont'd).

Specific Comment #14: Table 4.16, pages 122–123 – Some nomenclature should be revised. Minke Whale should be referred to as the Common Minke Whale North Atlantic subspecies. Atlantic population should be specified for the Sei Whale and Blue Whale. Atlantic and Eastern Arctic subspecies should be specified for the Harbour Seal.

Response: These changes have been made to Table 4.16 (see below):

Table 4.16. Marine mammals with reasonable likelihood of occurrence in the Study Area.

Species	Study Area		Habitat	*SARA* Status[a]	COSEWIC Status[b]
	Occurrence	Season			
Baleen Whales (Mysticetes)					
North Atlantic Right Whale (*Eubalaena glacialis*)	Rare	Summer	Coastal, shelf & pelagic	Schedule 1: Endangered	E
Humpback Whale (*Megaptera novaeangliae*) (Western North Atlantic population)	Common	Year-round; mostly spring–fall	Coastal & banks	Schedule 3: Special Concern	NAR
Common Minke Whale (*Balaenoptera acutorostrata acutorostrata* (North Atlantic subspecies)	Common	Year-round; mostly spring–fall	Coastal, shelf, & banks	NS	NAR
Sei Whale (*B. borealis*) (Atlantic population)	Uncommon	Spring–fall	Pelagic	NS	DD
Fin Whale (*B.physalus*) (Atlantic population)	Common	Year-round; mostly spring–fall	Shelf breaks, banks & pelagic	Schedule 1: Special Concern	SC
Blue Whale (*B. musculus*) (Atlantic population)	Uncommon	Year-round	Coastal & pelagic	Schedule 1: Endangered	E
Toothed Whales (Odontocetes)					
Sperm Whale (*Physeter macrocephalus*)	Common	Year-round	Slope, canyons & pelagic	NS	NAR; MPC
Northern Bottlenose Whale (*Hyperoodon ampullatus*) (Scotian Shelf and Davis Strait-Baffin Bay-Labrador Sea populations)	Uncommon	Year-round	Slope, canyons & pelagic	Schedule 1: Endangered [c] / NS [d]	E [c] / SC [d]
Sowerby's Beaked Whale (*Mesoplodon bidens*)	Rare	Year-round	Slope, canyons & pelagic	Schedule 1: Special Concern	SC
Striped Dolphin (*Stenella coeruleoalba*)	Rare	Summer	Shelf & pelagic	NS	NAR
Atlantic Spotted Dolphin (*Stenella frontalis*)	Rare	Spring–Summer	Shelf, slope & pelagic	NS	NAR
Short-beaked Common Dolphin (*Delphinus delphis*)	Common	Spring–Fall	Shelf & pelagic	NS	NAR
White-beaked Dolphin (*Lagenorhynchus albirostris*)	Common	Year-round	Shelf & pelagic	NS	NAR
Atlantic White-sided Dolphin (*Lagenorhynchus acutus*)	Common	Year-round	Coastal & shelf	NS	NAR
Common Bottlenose Dolphin (*Tursiops truncatus*)	Rare	Spring–fall	Coastal & pelagic	NS	NAR
Risso's Dolphin (*Grampus griseus*)	Rare	Year-round	Continental slope	NS	NAR

Species	Study Area		Habitat	*SARA* Status[a]	COSEWIC Status[b]
	Occurrence	Season			
Killer Whale (*Orcinus orca*) (Northwest Atlantic/Eastern Arctic population)	Uncommon	Year-round	Coastal & pelagic	NS	SC
Long-finned Pilot Whale (*Globicephala melas*)	Common	Year-round	Shelf break, pelagic & slope	NS	NAR
Harbour Porpoise (*Phocoena phocoena phocoena*) (Northwest Atlantic population)	Uncommon	Year-round	Coastal, shelf & pelagic	Schedule 2: Threatened	SC
True Seals (Phocids)					
Harp Seal (*Pagophilus groenlandicus*)	Common	Year-round; mostly winter–spring	Pack ice & pelagic	NS	NC; LPC
Hooded Seal (*Cystophora cristata*)	Common	Year-round; mostly winter–spring	Pack ice & pelagic	NS	NAR; MPC
Grey Seal (*Halichoerus grypus*)	Uncommon	Year-round; mostly summer	Coastal & shelf	NS	NAR
Harbour Seal (*Phoca vitulina concolor*) (Atlantic and Eastern Arctic subspecies)	Uncommon	Year-round	Coastal	NS	NAR

[a] Species designation under the Species at Risk Act (*SARA* website 2018); NS = No Status.

[b] Species designation by COSEWIC (Committee on the Status of Endangered Wildlife in Canada; COSEWIC website 2017); E = Endangered, SC = Special Concern, DD = Data Deficient, NAR = Not at Risk, NC = Not Considered, LPC = Low-priority Candidate, MPC = Mid-priority Candidate.

[c] Scotian Shelf population.

[d] Davis Strait-Baffin Bay-Labrador Sea population.

Specific Comment #15: § 4.5.1.2 Baleen Whales, Mysticetes, pages 123–127 – When describing mysticetes, ensure that population or subspecies is noted. Periods of sightings described in the text (e.g., Humpback Whale, paragraph 1, sentence 2, page 123) are inconsistent with Table 4.17 and should be revised accordingly.

Response: The populations to which the species/subspecies in the Study Area belong are noted in Table 4.16 and are not repeated in the species descriptions, as they are based on Table 4.16.

Table 4.17 shows the months in which species were recorded. In contrast, the text under the species descriptions summarizes the months sightings were predominant; this information is not shown in Table 4.17. Thus, no changes to the text in the species descriptions or Table 4.17 are required. However, we have made some changes to period of occurrence in Table 4.16 to be more consistent with the text and Table 4.17.

Specific Comment #16: § 4.5.1.3 Toothed Whales, Odontocetes, pages 128–133 – When describing odontocetes, ensure that population is noted. Periods of sightings described in the text (e.g., Northern Bottlenose Whale, paragraph 2, final sentence, page 128) are often inconsistent with Table 4.17 and should be revised accordingly.

> ***Response:*** The populations to which the species in the Study Area belong are noted in Table 4.16 and are not repeated in the species descriptions.
>
> Table 4.17 shows the months in which species were recorded. In contrast, the text under the species descriptions summarizes the months sightings were predominant; this information is not shown in Table 4.17. Thus, no changes to the text in the species descriptions or Table 4.17 are required. However, we have made some changes to period of occurrence in Table 4.16 to be more consistent with the text and Table 4.17.

Specific Comment #17: Table 4.19, pages 138–139 – For Atlantic Salmon (various populations), please provide the population names.

> ***Response:*** The population names encompassed by "various populations" for Atlantic salmon in Table 4.19 include the following:
>
> - Quebec Eastern North Shore (COSEWIC *special concern*);
> - Quebec Western North Shore (COSEWIC *special concern*);
> - Anticosti Island (COSEWIC *endangered*);
> - Inner St. Lawrence (COSEWIC *special concern*);
> - Gaspe-Southern Gulf of St. Lawrence (COSEWIC *special concern*);
> - Eastern-Cape Breton (COSEWIC *endangered*);
> - Nova Scotia Southern Upland (COSEWIC *endangered*); and
> - Outer Bay of Fundy (COSEWIC *endangered*).

Specific Comment #18: § 4.6.2.3 Marine Mammals and Sea Turtles, pages 141–144 – Atlantic population should be specified for the Leatherback Sea Turtle (paragraph 1, sentence 1, page 141; Leatherback Sea Turtle, paragraph 1, sentence 1, page 143). For the Northern Bottlenose Whale, period of sightings described in the text (Northern Bottlenose Whale, paragraph 2, sentence 3, page 142) is inconsistent with Table 4.17 and should be revised accordingly. Designation status of Loggerhead Sea Turtle should be provided (Loggerhead Sea Turtle, pages 143–144).

> ***Response:*** The populations to which the species in the Study Area belong are noted in Table 4.18 and are not repeated in the turtle species descriptions, as they are based on Table 4.18.

Table 4.17 shows the months in which Northern Bottlenose Whales were recorded. In contrast, the text under the species description summarizes the months sightings were predominant; this information is not shown in Table 4.17. Thus, no changes to the text or Table 4.17 are required.

The designation status was not included from the species description for the loggerhead turtle, but it is provided in Table 4.16 and 4.19, so it does not necessarily need to be repeated in the text.

Specific Comment #19: Figure 4.40, page 145 – A number of additional areas should be included in this Figure and described throughout the Report as appropriate. - There are several additional EBSA's identified by the Conference of the Parties to the Convention on Biological Diversity located outside Canada's EEZ in the Northwest Atlantic, some of which may overlap the Study Area. https://www.cbd.int/ebsa/

- Southeast Shoal and Adjacent Areas on the Tail of the Grand Bank https://chm.cbd.int/database/record?documentID=204105
- Slopes of the Flemish Cap and Grand Bank https://chm.cbd.int/database/record?documentID=204104
- Orphan Knoll https://chm.cbd.int/database/record?documentID=204103
- Seabird Foraging Zone in the Southern Labrador Sea https://chm.cbd.int/database/record?documentID=204102

- The St. Anns Bank Marine Protected Area designation under the Oceans Act was announced on June 8, 2017. It is located east of Cape Breton, and includes most of St. Anns Bank, Scatarie Bank, and a portion of the Laurentian Slope and Channel. The area is 4,364 km2 http://www.dfo-mpo.gc.ca/oceans/mpazpm/stanns-sainteanne-eng.html
- The Northeast Newfoundland Slope Marine Refuge was announced in December 2017 to protect coral and sponge areas and prohibits bottom contact fishing. This closure overlaps the Study Area. http://www.dfompo.gc.ca/oceans/oeabcm-amcepz/refuges/northeastnewfoundlandslopetalusnordestdeterreneuve-eng.html

Response: The St. Anns Bank MPA announced in June 2017 is beyond the Study Area, and will not be added to Figure 4.40. The remaining five sites listed in the above comment were added to Figure 4.40 (see below).

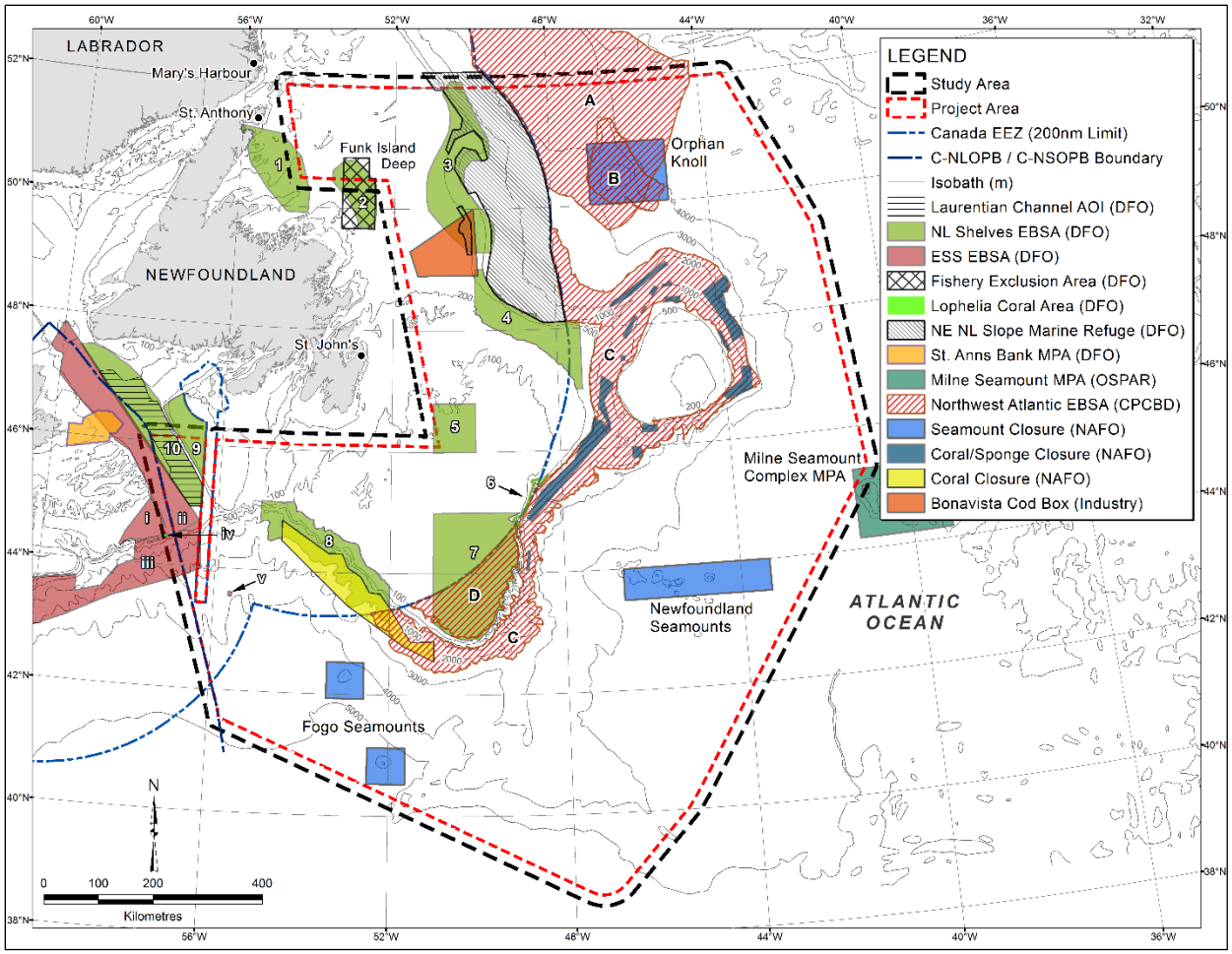


Figure 4.40. Location of sensitive areas that overlap the MKI Study Area.

Replace the bulleted list of sensitive areas entirely or partially within the Study Area with the following:

- Fourteen NAFO coral/sponge fishery closure areas, and the 3O Coral Protection Zone;
- Four seamount fishery closure areas: Orphan Knoll Seamount; Newfoundland Seamount; Fogo Seamount 1; and Fogo Seamount 2;
- Ten NL Shelves Bioregion Ecologically and Biologically Significant Areas (EBSAs): (1) Grey Islands; (2) Notre Dame Channel; (3) Orphan Spur; (4) Northeast Shelf and Slope; (5) Virgin Rocks; (6) Lilly Canyon-Carson Canyon; (7) Southeast Shoal and Tail of the Banks; (8) Southwest Shelf Edge and Slope; (9) St. Pierre Bank; and (10) Laurentian Channel Slope;

- Five Scotian Shelf Bioregion EBSAs: (i) Eastern Shoal; (ii) Laurentian Channel Cold Seep Communities; (iii) Laurentian Channel Slope; (iv) Scotian Slope; and (v) Stone Fence and Laurentian Environs;
- Four Conference of the Parties to the Convention on Biological Diversity (CPCBD) EBSAs: (A) Seabird Foraging Zone in the Southern Labrador Sea; (B) Orphan Knoll; (C) Slopes of the Flemish Cap and Grand Bank; and (D) Southeast Shoal and Adjacent Areas on the Tail of the Grand Bank;
- DFO Laurentian Channel Area of Interest (AOI);
- Bonavista Cod Box;
- One Fishery Exclusion Area: Funk Island Deep;
- One Marine Protected Area (MPA): Milne Seamount Complex – designated internationally as a component of the OSPAR Network of MPAs (IUCN and UNEP-WCMC 2016); and
- One Marine Refuge: Northeast Newfoundland Slope Closure.

Add the following paragraphs after the *Lophelia* Coral Conservation Area paragraph on page 144 of the EA:

"The Convention on Biological Diversity (CBD) is an initiative of the United Nations that entered into force in 1993 to support the world's growing commitment to sustainable development. The first session of the Conference of the Parties of the CBD (CPCBD) occurred in 1994 (CBD 2018). The CPCBD has provided guidance and support for the identification of EBSAs beyond Canada's EEZ in the Northwest Atlantic. Four CPCBD EBSAs occur within or partially within the Study Area, as noted in the bulleted list above. The Seabird Foraging Zone in the Southern Labrador Sea EBSA is partially within the northeast portion of the Study Area and overlaps the Orphan Knoll NAFO Seamount Closure Area and Orphan Knoll CPCBD EBSA. This EBSA is important foraging habitat for seabirds, including overwintering Black-legged Kittiwake and Thick-billed Murre, and for breeding Leach's Storm-petrels (CBD 2018). The Orphan Knoll EBSA includes a sub-sea island of hard substratum and unique, complex habitats arising from the seafloor, surrounded by the deep, soft sediments of the Orphan Basin (CBD 2018). The Orphan Knoll is much deeper than the adjacent continental slope and features distinctive marine fauna, including larvae and fragile and long-lived corals and sponges (CBD 2018). The Slopes of the Flemish Cap and Grand Bank EBSA encompasses all 14 NAFO coral/sponge closure areas, and overlaps portions of the NAFO 3O Coral Protection Zone and Southwest Shelf Edge and Slope NL Shelves Bioregion EBSA (although this is anticipated to change when the new delineation of NL Shelves Bioregion EBSAs is released in the near future). This EBSA also includes a component of the

Greenland halibut fishery grounds in international waters (not shown), serves as habitat for numerous species at risk, and supports a high biodiversity of marine taxa (CBD 2018). The majority of the Southeast Shoal and Adjacent Areas on the Tail of the Grand Bank EBSA overlaps the southern half of the Southeast Shoal and Tail of the Banks NL Shelves Bioregion EBSA, although this overlap is anticipated to change with the new NL Shelves EBSA delineation. This EBSA also contains a portion of the Greenland international halibut fishery grounds (not shown), and supports species at risk and high species biodiversity (CBD 2018).

DFO utilizes a variety of area-based conservation management measures in Canadian waters, including delineating areas determined to provide marine refuge to fish, mammals and their habitat (DFO 2018a). The Northeast Newfoundland Slope Closure Marine Refuge is located in the northwest portion of the Study Area, within the Canadian EEZ and partially overlapping the Orphan Spur NL Shelves Bioregion EBSA and Bonavista Cod Box. This ~46,833 km^2 Marine Refuge is intended to protect corals and sponges, and contribute to the long-term conservation of biodiversity (DFO 2018a). Bottom-contact fishing activities are prohibited within the Refuge, as are other human activities that are incompatible with the conservation of the Refuge's ecological components of interest (DFO 2018a). The bounding coordinates for the Marine Refuge were announced 22 December 2017, and came into effect 1 January 2018 (DFO 2017c)."

Specific Comment #20: § 4.7.1 Sensitive Areas associated with the Study Area, paragraph 3, page 146 – The sentence "for a description of this AOI, listed as 'Laurentian Channel and Slope EBSA'" requires some clarification. The original AOI was based on the EBSA (biological/physical features and boundaries); however since the AOI announcement in 2010, these boundaries have since been refined with separate conservation and management objectives. EBSAs are meant to focus management attention and apply a higher degree of risk aversion to these areas whereas AOI's are identified as containing ecologically-sensitive land or species that require extra protection. This is the first step in the Oceans Act MPA process. http://www.dfo-mpo.gc.ca/oceans/aoi-si/laurentianlaurentien-eng.html

Response: Replace "The Laurentian Channel AOI is currently being proposed as an MPA (DFO 2017e). See Table 3.22 *in* the Southern Newfoundland SEA (C-NLOPB 2010) for a description of this AOI, listed as 'Laurentian Channel and Slope EBSA'." with "The Laurentian Channel AOI is currently being proposed as an MPA (DFO 2017e). Announced in June 2010, the 35,840 km^2 Laurentian Channel AOI encompasses a 1,200-km long, deep submarine valley, from the intersection of the St. Lawrence and Saguenay Rivers to the edge of the Newfoundland continental shelf (DFO 2018b). The AOI contains the highest concentration of black dogfish (*Centroscyllium fabricii*) in Canadian waters, and is the only pupping location for this species (DFO 2018b). It is an important

spawning, nursery and feeding area for various other marine species, including porbeagle shark and smooth skate, and is a critical migration route for marine mammals transiting in and out of the Gulf of St. Lawrence (DFO 2018b). The Laurentian Channel AOI also hosts northern wolffish and leatherback sea turtle, both of which are species at risk (DFO 2018b). The specific objectives for proposing this AOI as an MPA are to protect corals, black dogfish, smooth skate and porbeagle from human activities and/or human-induced mortality, and promote the survival and recovery of northern wolffish and leatherback sea turtles by minimizing risk of harm from human activities within the AOI (DFO 2018b)."

Specific Comment #21: § 4.7.1 Sensitive Areas associated with the Study Area, paragraph 1, page 147 – The new delineation of EBSAs discussed here is expected to be released soon. Please note that in addition to the boundaries, the number of EBSAs is expected to change.

Response: So noted. The new delineation of NL Shelves Bioregion EBSAs and changed number of EBSAs will be incorporated into future EA Updates after they are released.

Specific Comment #22: § 4.7.2 Data Gaps associated with the Sensitive Areas VEC, paragraph 3, page 147 – In reference to the ERAs and proposed fisheries closures, several marine refuges within the Newfoundland and Labrador Region were announced in December 2017. The list of marine refuges can be found at the following link: http://www.dfompo.gc.ca/oceans/oeabcm-amcepz/refuges/index-eng.html

Response: Replace the last sentence in the paragraph in reference to the ERAs and proposed fisheries closures in Subsection 4.7.2 with the following:

"To this end, several Marine Refuges were announced in December 2017 within the Newfoundland and Labrador Region (DFO 2018a). Of the 19 Marine Refuges which occur in the Newfoundland and Labrador Region, three occur within the Study Area, the Division 3O Coral Closure (equivalent to the portion of the NAFO 3O Coral Protection Zone within the Canadian EEZ), Funk Island Deep Closure (equivalent to the DFO Funk Island Deep Fishery Exclusion Area), and Northeast Newfoundland Slope Closure. Any new information that has been made available since the two SEAs were completed and for areas that were beyond the scope of the SEAs is noted throughout Subsections 4.2 and 4.7.1."

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APPENDIX A – MULTIKLIENT INVEST AS SEISMIC PROGRAMS OFFSHORE NEWFOUNDLAND AND LABRADOR 2018 NEWSLETTER

Multiklient Invest AS | **Seismic Programs Offshore Newfoundland & Labrador 2018**

Resumption of the Program in 2018

This news update is to inform stakeholders and other interested parties of the continuation of MKI's current seismic program, started in 2011, in waters offshore Newfoundland and Labrador. The Project Area is within the regulatory jurisdiction of the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) and it is expected that the Ramform Hyperion, Ramform Sterling and Sanco Atlantic will be acquiring data between June and October 2018

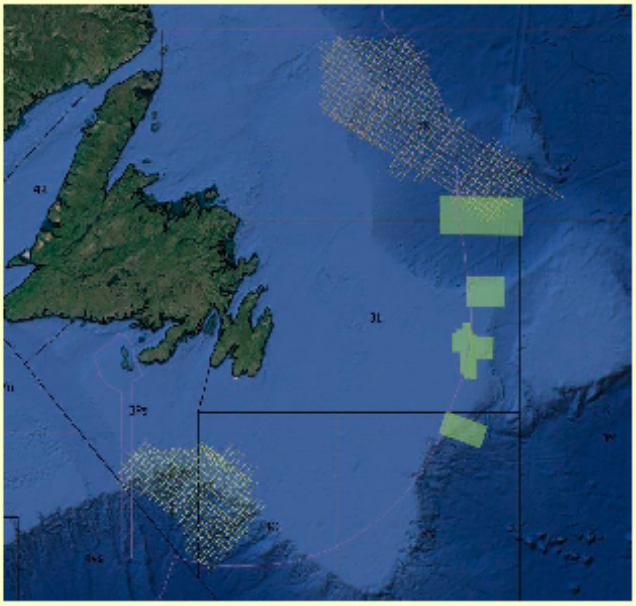

Figure 2: Provisionally planned areas for 2018

Figure 1: Seismic Vessels due to work in the province during 2018

How to Access Environmental Information about the Project

The Environmental Assessment (EA) for the Multiklient Invest AS Newfoundland Seismic Program 2018-2023 along with additional documentation including the Annual EA Update can be accessed on the C-NLOPB website (www.cnlopb.ca).

From the C-NLOPB homepage, click on the "*Environment*" link near the bottom of the page. Then click on the "Project-Based Environmental Assessment" link. Click on the "*Active*" link. Once this page has opened, scroll down to the project titled "*Multiklient Invest AS Newfoundland Seismic Program 2018-2023*" and click on the link. Here you can find all environmental documents related to this project.

The EA provides a comprehensive and detailed overview of the project. The overview includes: information on the Physical and Biological Environment, including Fisheries, Fish and Fish Habitat, Marine Mammals and Species at Risk, and a Cumulative Effects Assessment.

Upon the completion of every acquisition season an Environmental Report is supplied to the C-NLOPB and other government agencies. This report summarizes the marine mammal observations, bird observations and interactions with fishing

Ongoing Communication

As a component of the ongoing communications between MKI and local fisheries organizations, MKI will be providing weekly briefing materials including information such as updated schedules, maps, and/or revised timelines.

Employment Opportunities

Employment opportunities associated with this year's operating season have been considered and it has been determined that there will be possible hiring opportunities as part of the maritime crew. The recruitment process through a local agency will commence in the coming weeks and interested parties should look out for notices posted in community employment offices and other advertisements

Contact Information

If you have any inquiries regarding the Multiklient Invest AS Newfoundland Seismic Program 2018-2023 please feel free to contact:

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